FACTS

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Ontario

Ministry of the Environment

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Minister

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ABOUT THE GREAT LAKES

ENVIRONMENT ONTARIO'S GREAT LAKES AND WATER QUALITY SURVEILLANCE

In 1984/85, Environment Ontario will spend approximately $3 million on the investigation of water quality and aquatic conditions of the Great Lakes and connecting waterways.

Ontario's Great Lakes surveillance program is designed to meet the priorities and needs of the Ministry of the Environment to investigate areas of aquatic degradation, to recommend control measures, to measure the effectiveness of remedial programs and actions, to provide early warning of emerging problems and to identify long term trends. The surveillance activities also fulfill Ontario's requirements under the Canada-Ontario Great Lakes Water Quality Agreement.

Information gained in the various projects is made available to the International Joint Commission to allow the Commission to evaluate the progress made by Canada and the United States in meeting the objectives of the Canada - U.S. Great Lakes Water Quality Agreement.

Highlights of Environment Ontario studies planned, under way or nearing completion in the Great Lakes in 1984/85 are:

GREAT LAKES SURVEILLANCE PROGRAM 1984

LAKE SUPERIOR

The intensive investigation of Lake Superior in 1983 was completed and efforts will be expanded to complete reports on:

Embayments -- The examination, immediately after spring melt, of ten embayments along the Canadian shore to provide a comparison to 1973, and the detection of possible new problems in the nearshore areas.

In 1983, 172 stations were sampled in Goulais, Batchawana, Nipigon, Ashburton, Black, Thunder, Jackfish and Pine Bays and Peninsula and Michipicoten Harbors.

Thunder Bay -- The determination of the degree and extent of water quality impairment in the bay as a result of industrial and municipal wastewater discharges, the identification of possibly emerging problems, and the update of 1976 findings.

Peninsula Harbor -- The determination of the degree and extent of impairment of water quality resulting from wastewater discharges from James River Marathon pulp mill and the Marathon sewage treatment plant.

Nipigon Bay -- The determination of impairment resulting from discharges from Domtar Pulp and Paper mill and Red Rock sewage treatment plant.

Trace contaminant biomonitoring: -- The presence of low levels of contaminants in Nipigon and Jackfish Bay resulting from pulp and paper mill discharges.

Embayment benthos and sediments: -- An assessment of sediment and benthic community composition and contamination in four embayments.

Filamentous algae and contaminants -- The survey of filamentous algae growth and their contaminants level to establish a data base as possible supportive evidence of point source contaminant loadings.

LAKE HURON

St. Marys River -- Continued assessment of effectiveness of control measures, on the ecosystem as result of Great Lakes Power Redevelopment Project. Biomonitoring sampling using freshwater clams and yearling fish at 10 sites.

Penetang-Midland-Sturgeon Bay -- Continued assessment of water quality improvement resulting from reduced phosphorus loading from enlarged sewage treatment plants.

LAKE ERIE

The survey vessel "Guardian No. 1" will concentrate its 1984 investigations in the St. Clair River - Detroit River system on:

St. Clair River, Lake St. Clair, Detroit River contaminant loading: -- (1st year of three) -- To establish a data base for trace contaminants in water and suspended sediments from tributaries and point sources. Assess effectiveness of remedial measures and identify emerging problems.

St. Clair/Detroit River trace organics: (1st year of three) -- To determine levels of trace organics at the head waters and mouths of the rivers and to estimate loading from Lake Huron and to Lake Erie.

St. Clair and Detroit River biomonitoring -- To provide information relevant for remedial action or assessment of remedial measures. This is a follow-up study on previous clam and yearling fish tests.

Detroit River -- To assess the effectiveness of municipal control measures (expansion of West Windsor and Little River sewage treatment plants and sewer separation) on bacteriological conditions in the river.

Rondeau Bay -- To estimate the mass exchange between Rondeau Bay and Lake Erie for an assessment of the bay's assimilative capacity and to formulate an abatement program to control the high turbidity levels and promote better recreation and fishing.

Nanticoke -- An integrated report on aquatic changes (1968-78) at Nanticoke and Long Point Bay to determine whether industrialization has affected long term trends.

LAKE ONTARIO

Upper and Lower Niagara Water Quality: -- (5th year - ongoing) -- Assess the impact of U.S. and Canadian industrial discharges and non-point source drainage on water quality and biota and to detect trends in trace contaminants, nutrients and bacteria levels. Previous studies have revealed elevated levels of heavy metals, PCBs and organochlorine pesticides in suspended and bottom sediments at a number of locations. Biomonitoring studies using clams indicated the Tonawanda Channels as a source of PCBs, BHCs, dieldrin, endrin and hexachlorobenzenes. Studies will be conducted with yearling fish, algae and drinking water quality monitoring programs, to determine changes in contaminant levels and transboundary movements.

Nearshore Cladophora contaminant monitoring: -- (5th year - ongoing) -- To monitor Cladophora contaminant levels at selected shore sites on Lake Ontario and the Niagara River, to evaluate evidence for point source contamination loadings. Nine sites on Lake Ontario and 17 sites on the Niagara River will be sampled at peak biomass time (June/July) for determination of concentrations of PCB, selected heavy metals and nutrients.

Welland Canal/Twelvemile Creek: (lst year) -- To define sources and the impact of industrial and municipal discharges on water, sediment and biota quality. Previous indications of high levels of copper, phenols, methylene chloride and tetrachloroethylene as well as PCBs need further investigation before controls are implemented.

Hamilton Harbor -- effects on Lake Ontario and impact of reduction in industrial and municipal discharges: -- Prediction of the effects of the reduction of ammonia, BOD and phosphorus on water quality, check the validity of the oxygen model and define feasible management options.

Oakville - Ford Plant: -- To investigate the effect and the efficiency of the Ford plant outfall on nearshore Lake Ontario.

Clarkson: -- Identification of the extent of the sewage plume from a new outfall of the sewage treatment plant and assessment of its possible impact on nearby water use.

Toronto Waterfront - inputs: -- Continued documentation of bacterial water quality in the Toronto waterfront at major point source inputs and assessment of long-term changes resulting from remedial measures. Twice weekly sampling by the City of Toronto to be conducted at 14 stations at the Don and Humber River mouths and major combined sewer outflows.

Toronto Waterfront - effects of Keating Channel dredging/lakefilling: -- (5th year - ongoing) -- Monitoring of water and suspended sediment quality in the vicinity of the East Headland construction and Keating Channel dredged material disposal to assess potential interference with water uses.

Toronto Waterfront - Bacteriological status of beaches: -- Assessment of the effects of storm and combined sewers overflow discharges on the quality of the receiving waters with emphasis on the control measures and bacterial condition of recreational zones of the western and eastern beaches.

Belleville - Bacteriological status following STP expansion: -- Assessment of the effectiveness of the expansion of the Belleville sewage treatment plant and the installation of diffuser outfall on receiving water quality.

St. Lawrence River - Maitland: -- Biological monitoring and sediment sampling to determine impact of industrial discharges from Dupont of Canada Ltd. on river water and biota. In 1983 Fisheries and Oceans Canada found elevated levels of lead compounds in fish in the area.

St. Lawrence River - Iroquois, Morrisburg and Cardinal: -- Assessment of the effect of sewage treatment plant discharges in the three communities on water quality.

St. Lawrence River - Cornwall, Massena: Continued investigation of sources of trace contaminants and assessment of their impact on water quality.

BASIN-WIDE STUDIES AND SUPPORT ACTIVITIES

Environmental impact of "in-place pollutants" in sediment: -- (2nd year-on-going) -- Assessment of the potential hazard of selected contaminants in sediments at several areas of known sediment contamination and the development of strategies for the management of such contaminated sediments. The assessment will address the levels of contaminants in sediments and in benthic organisms and the potential effect of selected metals to biota.

The survey will cover the Lower St. Clair, the Detroit and the St. Lawrence rivers and the Toronto waterfront.

Impact of lakefill embayments on nearshore sediment quality: -- Determination of water quality in embayments created by lakefills and assessment of changes in benthic diversity and contaminant levels.

Nearshore young-of-the-year fish contaminants surveillance -- Establishment of a data base for trend assessment, identification of areas of concern. In previous years data were obtained for 45 localities. This year data will be collected in the Niagara, Detroit, St. Clair and St. Lawrence Rivers on both sides of the borderline, Lake Ontario, Lake Superior, Lake Huron and Lake St. Clair for contaminant trend assessment.

Stratified tributary monitoring: -- To enhance the precision of annual tributary nutrient and contaminant loading estimates for significant tributaries to the Great Lakes.

Water works intake monitoring program: -- Continued water quality monitoring at water intakes of water treatment plants at Thunder Bay, Terrace Bay, Goderich, Grand Bend, Lambton, Amherstburg, Kingsville, Blenheim, Elgin, St. Thomas, Dunnville, Bertie Township, Grimsby, South Peel, Metro Toronto, Cobourg, Kingston and Brockville. This program identifies changes in nearshore water quality.

Intake verification: -- To determine whether sampling at water intakes is representative of open lake conditions.

Interlake mass balance: -- To provide an estimate of phosphorus and other nutrient inflow/outflow loading relationships in the Great Lakes. In 1984/85 water intakes and the river waters at Sault Ste. Marie, Sarnia and the Upper Niagara River will be sampled and a new sampling location at the head of the Detroit River will be evaluated. This program monitors progress in reducing nutrient loadings to the Great Lakes.

Development of instrumentation: -- To ensure use of cost-effective and technically advanced instrumentation suitable for data acquisition and recording of effluent plume characteristics.

Development of sampling technology and quality control and assurance methodologies: -- To test sampling equipment to ensure that representative and uncontaminated samples are collected especially for trace contaminants and to compare new and existing methodologies and instrumentations. To develop a sampling method to concentrate dissolved trace organics for sampling of low level concentrations.